



# HOW TO AVOID RISKS ASSOCIATED WITH URBAN GROWN FOOD?

## Challenge

Urban food growing is becoming more and more popular but gardens in the urban environment are often subject to environmental pressures caused by both pollution as well as gardeners' behaviours.

The main risk is represented by a lack of knowledge of urban environmental aspects such as soil, air and water. The safety of self-produced urban-grown food may be threatened by environmental contamination and poor crop management, possibly affecting consumers' health. Contamination of soil and water can result from previous use and site location (e.g. road traffic, railways, industrial sites, burning fossil fuel, incineration of household waste). Poor crop production can include: inadequate pest and disease control strategies (use of persistent chemicals); over-fertilization with chemicals (presence of heavy metals in fertilizers); quality of irrigation water (e.g. whether rainwater, groundwater or grey-water); addition of contaminated material or soil additives (e.g. treated and painted wood, fire ash, manure, etc.); low quality or fertility of soil leading a gardener to over-use chemicals.

This factsheet will guide readers on considering the potential risks associated with food production in the urban environment and possible strategies to limit them. Environmental risks may be highlighted through preliminary evaluation (e.g. soil and water analyses, history of the site), whereas safe practices may be pursued by creating awareness (e.g. by repeated training and dissemination events).





Image 2 - The overuse of plastic as a mulch is not a good practice for UAG, it can be substituted by natural materials. Photo: Francesca Bretzel



Image 3 - Cultivation in bags is possible and is cheaper than raised beds. Photo: Francesco Orsini

## Message to Gardeners

### How to avoid contamination?

- Pesticides can have unintended impacts on non target animal species and people, they can reduce the number of beneficial predator insects such as ladybirds and hoverflies, cause the pollution of soil, water and edible garden products and increase the resistance to some pests. Organic plant protection is carried out without pesticides with the emphasis on control, not eradication.
- The overuse of chemical fertilizers can exhaust the soil, reducing its long term fertility, while using manure helps the long term fertility and boosts the soil microfauna, beneficial for the soil processes and the plant growth. The use of self produced compost is also a great solution to improve soil fertility, contribute to increase biodiversity and reduce the amount of domestic waste.

### How to deal with urban pollution?

- In the case of a risk of soil being contaminated, adopt soilless growing systems or raised beds with clean soil.
- Carefully wash hands after working in the garden to avoid chemical and microbiological risk, and wash all food thoroughly before consumption.

- Use green barriers and hedges near roads with heavy traffic.

### Further advice:

- Consider the plant characteristics and growth demands, as well as the site-specific conditions.
- Landraces (traditional varieties) are adapted to the local pedo-climatic conditions and are less demanding in terms of external inputs.
- Ecological criteria include the use of non-polluted wood preservatives, rot-resistant woods and renewable, recycled or reusable materials for building structures.
- Limit the use of plastic: it tends to crumble with time and mix with soil.
- Don't burn plastic and chemically treated green cuttings.
- Avoid the use of all insect killers, included the organic ones: they tend to affect predators and pollinators.
- Adopt pest resistant plants, crop rotation, plants producing pest repellent essential oils or root saps and plants that attract natural predators, such as wildflowers.
- Remove weeds manually and inhibit their growth by mulching with mature compost, wood or bark chips, grass or agro-textiles.

## Learn More

### Useful links

<http://www.hortis-europe.net/>  
[http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/\\_pdf/projects/urban-soil-safety/CLF%20Soil%20Safety%20Guide.pdf](http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-a-livable-future/_pdf/projects/urban-soil-safety/CLF%20Soil%20Safety%20Guide.pdf)

### Further reading

**Bretzel F., Calderisi**

**M., Scatena M., Pini R.**

2016. Soil quality is key for planning and managing urban allotments intended for the sustainable production of home-consumption vegetables. *Environmental Science and Pollution Research* 23(17):17753-60.

**Hursthouse, A.; Leitão, T.**

**et al.** (2016). Environmental pressures on and the status of urban allotments. – In: Bell, S. et al. (eds.) *Urban allotment gardens in Europe*. Routledge: 142-164.

**Jean-Soro, L., Le Guern, C., Bechet, B., Lebeau, T., & Ringard, M. F.** (2015).

Origin of trace elements in an urban garden in Nantes, France. *Journal of Soils and Sediments*, 15(8), 1802-1812.

**Orsini F., Marchetti L.,**

**Magrefi F., Draghetti**

**S., Bazzocchi G.** 2015.

Sustainable urban garden management. HORTIS Project.





Image 4 - Raised beds filled with good quality substrate are a solution in case of possible presence of pollutants in soil. Photo: Francesca Bretzel



Image 5 - Participant responding to a questionnaire<sup>1</sup>. Photo: Francesca Bretzel

## Message to Policy Makers

- Key factors to be considered for avoiding the risk of pollution are the suitability of the location in terms of soil fertility, to avoid the over use of fertilizers, and distance from sources of contaminants such as high traffic roads.
- Environmental and health risks from previous land use and from current impacts should be minimized. When the soil is contaminated raised beds with good quality substrate may be used.
- The occurrence of pollutants in soil (e.g. heavy metals and a range of anthropogenic hydrocarbons) should be assessed through complete soil analysis. In case of the presence of metals in the soil, in order to understand the possible risk of translocation in food, it is necessary to investigate the potential mobility and the bio-availability of the fraction which could transfer into the food chain through plant uptake. The direct exposure of plot users should also be taken into account (direct contact with sources).
- As cities become more and more concentrated, rooftops are becoming popular as gardening areas. They have the advantage of being less reachable by the traffic pollutants and avoid the risk of toxic waste disposal present in urban soil.

## Policy Brief

- In order to reduce the risk of siting gardens in areas where soil is contaminated or unsuitable because of poor quality, information about the geochemical background, and previous land use of the area should be collected, as well as complete soil analysis. Links with research bodies for soil chemical and physical surveys should be made.
- The site should comply with soil and water quality criteria which can be confirmed by direct chemical testing. In case this is too expensive a desk-based assessment should be used to confirm environmental quality. With an understanding of past and current activities, the impact from potentially polluting processes may be assessed.
- To avoid the impact of atmospheric deposition from traffic sources, plots should be located far from the pollutant sources, generally at least 50 m away. The designation of plots must also consider the location of industrial zones, and especially the prevailing wind and the potential atmospheric pollution plumes.
- Awareness and social responsibility may be promoted among gardeners and the civil society at large through dissemination events and training courses.

## Learn More

### Useful links

<http://www.urbanallotments.eu/>

### Further reading

**Säumel, I., Kotsyuk, I., Hölscher, M., Lenkerleit, C., Weber, F., Kowarik, I.** (2012). How healthy is urban horticulture in high traffic areas? Trace metal concentrations in vegetable crops from plantings within inner city neighbourhoods in Berlin, Germany. *Environmental Pollution*, 165, 124-132.

**Vittori Antisari, L., Orsini, F., Marchetti, L., Vianello, G., Gianquinto, G.** (2015). Heavy metal accumulation in vegetables grown in urban gardens. *Agronomy for Sustainable Development*, 35(3), 1139-1147.

**Voigt, A., Leitão, T. et al.** (2016): Lessons learned: indicators and good practice for an environmentally-friendly urban garden. – In: Bell, S. et al. (Hrsg.): *Urban allotment gardens in Europe*. Routledge: 165-197.

<sup>1</sup> Questionnaires are a good way to address the gardeners education in reducing the use of phytochemicals.

## AUTHORS

Francesco Orsini<sup>1</sup>, RESCUE-AB, Agricultural Sciences Department, Bologna University, Italy

Francesca Bretzel, CNR Institute for Ecosystem Study, Pisa, Italy

Andrew Hursthouse, University of West Scotland, UK

Zane Vincevica-Gaile, Department of Environmental Studies, Latvia University, Latvia

Teresa E. Leitão, LNEC, National Laboratory for Civil Engineering, Portugal

Sarka Petrova, Institute of Experimental Botany, Czech Republic

<sup>1</sup>corresponding author: f.orsini@unibo.it

INFO SERIES | ISSUE 1 V. ENGLISH | DATE OF ONLINE PUBLICATION: 20 JULY 2016

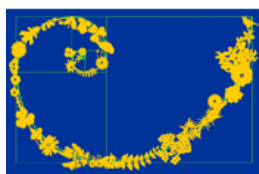


COST (European Cooperation in Science and Technology) is a pan-European intergovernmental framework. Its mission is to enable break-through scientific and technological developments leading to new concepts and products and thereby contribute to strengthening Europe's research and innovation capacities.

[www.cost.eu](http://www.cost.eu)



COST is supported by the EU Framework Programme Horizon 2020



Acknowledgement

This factsheet is based upon work from COST Action TU1201 Urban Allotment Gardens in European Cities, supported by COST (European Cooperation in Science and Technology)

[www.urbanallotments.eu](http://www.urbanallotments.eu)



Join urban gardens in Europe

<https://www.facebook.com/groups/825421310826607/>